

REMARKS:

Minor revisions are proposed to Figures 2 and 5-7. Claims 1 and 2 are amended; marked up versions of the amended claims are attached hereto pursuant to 37 C.F.R. § 1.121(c)(ii). Claims 1-3 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Figure 2 stands objected to because the Office contends that the word "plastical" should be "plastic". In response, proposed revisions to Figure 2 are submitted herewith in which the word "Plastical" is replaced with --Plastic--. Approval and entry of the proposed drawing change and withdrawal of the objection is respectfully requested.

Figures 5-7 stand objected to because the Office contends that the each of Figures 5-7 should bear a legend such as --Prior Art-- because only that which is old is illustrated. In response, proposed revisions to Figure 5-7 are submitted herewith in which a legend --Prior Art-- is added to Figures 5-7. Approval and entry of the proposed drawing change and withdrawal of the objection is respectfully requested.

Claim 1 stands rejected under 35 U.S.C. Section 102(b) as being anticipated by Aiki et al. (U.S. Patent No. 4,997,243). Claims 1 and 2 stand objected to as being anticipated by Ecker et al. (U.S. Patent No. 5,155,786). Claims 1 and 2 are amended. Applicant respectfully traverses the rejection as to the amended claims.

The present invention is directed to an optical device module for use in, for example, optical communications, and more particularly, to a fixing structure for an optical fiber which is inserted into a package of the module. (Specification, at p. 1, lines 5-9) As amended, claim 1 is as follows:

1. An optical device module comprising:
 - an optical device;
 - an optical fiber, an end portion of which is optically coupled to the optical device;
 - a package containing the optical device and the optical fiber; and

an insertion tube fixed through the wall of the package, the optical fiber extending through the insertion tube out of the package,

wherein the end portion of the optical fiber is offset with respect to a fixed portion of the optical fiber, which fixed portion is below the end portion and which fixed portion is sealed within the insertion tube, to bend the optical fiber between the end portion and the fixed portion of the optical fiber.

One important aspect of the present invention is that optical module requires that the "the end portion of the optical fiber is offset with respect to a fixed portion of the optical fiber, which fixed portion is below the end portion" and which fixed portion is sealed within the insertion tube, to bend the optical fiber between the end portion and the fixed portion of the optical fiber." (Emphasis added.) As explained in Applicant's Specification with reference to Figure 1 of the Specification, the insertion tube 3 fixed through the wall 21 of the package 2 is disposed such that the center axis of the ring member 17 is positioned lower than the optical axis 47 of the optical device 1. (Specification, at p. 10, lines 21-24.) The insertion tube 3, ring member 17 and optical fiber 4 are joined to each other by solder material 19 fused using high frequency induction heating then sealed air tight with each other. (Specification, at p. 10, lines 24 - p. 11, line 2.) This fixing structure allows the optical fiber 4 to be bent naturally in the vertical plane due to the offset between the end portion 41 of the optical fiber 4, at the fixing portion 45, which is sealed in the fiber insertion hole 6 at the center of the ring member 17. (Specification, at p. 11, lines 2-8.) In the embodiment of the present invention, the bending portion so formed along the optical fiber 4 (See Arc 18, Figure 1) can absorb the stress, and can effectively suppress the out-put fluctuation from the optical fiber, and at the same time, the module can easily and securely sealed air tight. (Specification, at p. 11, lines 13-18.)

Applicant respectfully submits that neither Aiki et al. (U.S. Patent No. 4,997,243) nor Ecker et al. (U.S. Patent No. 5,155,786) anticipate amended claims 1 and 2 because neither teaches or suggests an optical module in which “the end portion of the optical fiber is offset with respect to a fixed portion of the optical fiber, which fixed portion is below the end portion and which fixed portion is sealed within the insertion tube, to bend the optical fiber between the end portion and the fixed portion of the optical fiber” as is required by claim 1.

Aiki et al. is directed to a photoelectric device for optical communication in which an optical fiber is fixed at two fixing points so that the extremity of the optical fiber is disposed opposite to the light emitting surface of a laser diode chip and the optical fiber extends in a nonlinear shape, for example, in a moderate curve, between the two fixing points. (Aiki et al., Abstract). However, as shown in Figures 1 and 13 of Aiki et al., the end portion of the optical fiber 16 coupled to the semiconductor device is offset from the fixed portion of the optical in the insertion tube 4. However, in Aiki et al., the fixed portion is above the end portion and not below the end portion as is required by amended claim 1. Indeed, Applicant respectfully submits that nothing in Aiki teaches or suggests a construction in which the fixed portion of the optical fiber is below as is required by claim 1. Further, Applicant respectfully submits that nothing in Aiki et al. suggests a construction in which fixed portion is below the end portion to yield a disposition of optical fiber as shown in Figure 1 of Applicant's Specification. Since Aiki et al. fails to teach or suggest each claim limitation, Aiki et al. cannot anticipate the claimed invention and the invention of amended claim 1 patentably distinguishes over Aiki et al. Withdrawal of the rejection of claim 1, as amended, is respectfully requested.

Ecker does not anticipate amended claim 1 for much the same reason. As explained in Ecker et al. with respect to Fig. 4:

This expansivity differential between the optical fiber 23. and the TCM 10, can be accommodated by allowing a portion of the optical fiber 23, to arch inside the housing of the TCM 10, to provide strain relief. This is

accomplished by letting the distance between the optical fiber pedestal assembly 150, and the internal optical fiber exit point of the optical fiber mounting assembly 20, be the chordal distance subtended by an arc formed by the optical fiber 23, as shown in FIG. 4. The optical fiber 23, is predisposed to forming this arc, and this can be achieved by having the length of the optical fiber 23, be greater than the chordal distance. In this manner, any differential length can be transformed into a longer or shorter arc length for the optical fiber 23. The arc length variability is translated to flexure stress in the optical fiber 23, which provides strain relief at the fiber V-block 70. The external optical fiber connector should preferably be of a kind that provides strain relief. (Col. 7, lines 23-43).

Thus, as with Aiki et al., the fixed portion of the optical fiber is above the end portion and not below the end portion as is required by amended claim 1. Indeed, Applicant respectfully submits that nothing in Ecker et al. teaches a construction in which the fixed portion of the optical fiber is below the end portion as is required by claim 1. Further, Applicant respectfully submits that nothing in Ecker et al. suggests a construction in which fixed portion is below the end portion to yield a disposition of optical fiber as shown in Figure 1 of Applicant's Specification. As such, Ecker et al. cannot anticipate the claimed invention, and the invention of amended claim 1 patentably distinguishes over Ecker et al. Withdrawal of the rejection and allowance of claims 1 and 2 is respectfully requested.

Claim 3 stands rejected under 35 U.S.C. Section 103(a) as being unpatentable over Kwon et al. (U.S. Patent No. 6,190,056) in view of Aiki et al. (U.S. Patent No. 4,997,243). Claim 3 depends from claim 1, and as such includes all the limitation of amended claim 1. Applicant has already detailed how Aiki et al. fails to teach or suggest each limitation of claim 1 in that Aiki et al. does not teach or suggest "the

end portion of the optical fiber is offset with respect to a fixed portion of the optical fiber, which fixed portion is below the end portion and which fixed portion is sealed within the insertion tube, to bend the optical fiber between the end portion and the fixed portion of the optical fiber” as is required by claim 1. The Office admits that “Kwon fails to teach an offset between the device end of the fiber and the portion which is fixed in the insertion tube.” (Office Action, p. 4, Para. 8.) As such, Kwan does not supply the teaching or suggestions missing from Aiki et al. Therefore, because the combination cited by the Office fails to teach or suggest each claim limitation, the combination of references cannot render the claimed invention obvious.

Furthermore, claim 3 of the present application includes the limitation of the, “ferrule holder being capable of being deformed plastically.” On page 4 of the Office Action, the Examiner states that Kwon provides a plastically deformable fixture 510 for holding a ferrule. However, Kwon does not disclose whether the fixture is plastically deformable. Withdrawal of the rejection and allowance of claim 3 is respectfully requested.

The art made of record but not relied upon by the Examiner has been considered. However, it is submitted that this art neither describes nor suggests the presently claimed invention.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: October 18, 2002

By: Brian D. Martin
Brian D. Martin
Registration No. 47,771
Attorney for Applicants

500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
Phone: 213-337-6700
Fax: 213-337-6701

Version with markings to show changes made:

1. (Amended) An optical device module comprising:
an optical device[.];
an optical fiber, an end portion of which is optically coupled to the optical device[.];
a package containing the optical device and the optical fiber[.]; and
an insertion tube fixed through the wall of the package, the optical fiber extending through the insertion tube out of the package,
wherein the end portion of the optical fiber is offset with respect to a fixed portion of the optical fiber, which fixed portion is below the end portion and which fixed portion is sealed within the insertion tube, to bend the optical fiber between the end portion and the fixed portion of the optical fiber.
2. (Amended) The optical device module according to claim 1, wherein a ring member having [an] a through hole for inserting the optical fiber is inserted coaxially within the insertion tube and sealed with the insertion tube by soldering, through the ring member.